

**AMENDMENTS TO THE SPECIFICATION WITH MARKINGS TO SHOW  
CHANGES MADE**

Amend the following paragraph(s):

**[0018]**       -- According to another aspect of the present invention, an electric machine includes a stator yoke; a rotor, spaced from the stator yoke at formation of an air gap therebetween; and a fastening apparatus according to the present invention, wherein the stator yoke projects at least axially beyond winding overhangs located at an end face of the electric machine. By projecting extending the stator yoke of the electric machine in axial direction ~~beyond to~~ project over the winding overhangs and by wrapping the winding overhangs with a bandage at least in given axial sections, an even cross section of an essentially axial cooling system is realized between the stator yoke and the winding assembly fixed by the bandage. Therefore, the winding assembly is efficiently cooled, and heat transmission via the rotor-proximal cylinder surface is effectively eliminated.--.

**[0030]**       -- Turning now to the drawing, and in particular to FIG. 1, there is shown a cross sectional illustration of an electric machine, including a yoke 1 of a stator 2 which surrounds a rotor 6 at formation of an air gap 5 therebetween. The electric machine has a winding, constructed as air-gap winding 3, which is held in the air gap 5 between the rotor 6 and the stator yoke 1 by a fastening apparatus according to the present invention, generally designated by reference numeral 4.

The fastening apparatus 4 has a main body comprised of a cylindrical base 15 and a plurality of axial webs 8 which project radially outwards from the cylindrical base 8 15, as viewed in circumferential direction, whereby each of the webs 8 has a generally comb-like configuration through formation of depressions 16, as shown in FIG. 2.--.

**[0032]**        -- The webs 8 of the fastening apparatus 4 have a star-shaped configuration, whereby their outer ends serve as toothed members to engage complementary, essentially axial recesses 9 of the yoke 1 to. As a consequence of the engagement of the webs 8 in the yoke 1, tangential forces of the air-gap winding 3 can be absorbed by the yoke 1, e.g. when an electrical error situation is encountered. Of course, the illustrated configuration of the webs 8 should be considered by way of example only, as the webs may also have a wedge-shaped configuration or a dove-tailed configuration.--.

**[0037]**        -- In order to improve the cooling action in particular in the area of the winding overhang 11, the yoke 1 is axially extended ~~beyond~~ to project over the winding overhangs 11, as indicated by broken lines 12. Therefore, a cooling channel 10 of substantially identical cross section can be established effectively over the entire axial length of the stator 2 of the electric machine so as to ensure a sufficient ventilation of the air-gap winding 3 in the fastening apparatus 4 and the winding overhangs 11. As the base 15 defines a thermally closed cylinder surface 17 (FIG. 1) adjacent the air gap 5, the rotor 6 in particular is protected

from heat introduction generated by the stator 2. This is especially desirous in connection with superconductive rotors. Suitably, as shown in FIG. 4, the cylinder surface 17 has a net-like structure. As a result, a certain cooling effect is established in the air gap 5 as additional axial and radial cooling channels are realized in and around the winding assembly. The cooling action of the net-like structure of the rotor-facing cylinder surface 17 can be further positively influenced through configuring the webs 8 in a particular and aligned manner. A variation of the net-like structure of the cylinder surface 17 is shown by way of example in FIG. 5.--.

**AMENDMENTS TO THE CLAIMS WITH MARKINGS TO SHOW CHANGES  
MADE, AND LISTING OF ALL CLAIMS WITH PROPER INDENTIFIERS**

Claims 1-13 (Canceled)

14. (Currently Amended) An electric machine, comprising:

a stator yoke;

a rotor spaced from the stator yoke at formation of an air gap therebetween;

a winding assembly disposed at least partially in the air gap and having winding ends which form winding overhangs; and

a fastening apparatus for securing the winding assembly, wherein the fastening apparatus includes a main body made of electrically insulating non-magnetic material, said main body defined by an axis and including a cylindrical base and a plurality of webs extending in the direction of the axis and projecting radially outwards from the base in a direction of the stator yoke for at least partial engagement in complementary recesses in the stator yoke,

wherein the stator yoke projects at least axially ~~beyond~~ over the winding overhangs located at an end face of the electric machine.

15. (Currently Amended) The electric machine of claim 14, wherein each of the winding overhangs are is wrapped by a bandage at least about ~~sections a~~ predetermined section thereof.

16. (Original) The electric machine of claim 14, and further comprising axial cooling channels extending between the stator yoke and the winding assembly and having a cross sectional area extending substantially across the winding overhangs.
17. (Previously Amended) The use of a fastening apparatus according to claim 1 for a superconductive electric machine.
18. (Original) The use of claim 17 for synchronous generators.

Claims 19-22 (Canceled)

23. (Previously Added) The electric machine of claim 14, wherein the fastening apparatus is disposed at least partially in an air gap between the stator yoke and the rotor
24. (Previously Added) The electric machine of claim 14, wherein the webs have a comb-shaped configuration in the direction of the axis and include sections which are radially recessed for attachment of a bandage of the winding assembly.
25. (Previously Added) The electric machine of claim 24, wherein the bandage has a thickness which corresponds to a height of the radially recessed sections of the webs.

26. (Previously Added) The electric machine of claim 24, wherein the radially recessed sections of the webs as so configured as to allow an arrangement of the bandage in at least one of the wrappings selected from the group consisting of wrapping in circumferential direction and wrapping in helical configuration.
27. (Previously Added) The electric machine of claim 14, wherein the main body has a single-piece configuration.
28. (Previously Added) The electric machine of claim 14, wherein the main body includes different segments in at least one of axial direction and circumferential direction.
29. (Previously Added) The electric machine of claim 28, wherein the segments have means for allowing interconnection of the segments.
30. (Previously Added) The electric machine of claim 29, wherein the segments are interconnected by at least one of material-based joint and form-fitting engagement.
31. (Previously Added) The electric machine of claim 14, wherein the winding assembly is secured in place by at least one of a bandage and a casting onto the main body.

32. (Previously Added) The electric machine of claim 14, wherein the base of the main body has a closed cylinder surface in a direction toward the rotor.
33. (Previously Added) The electric machine of claim 32, wherein the cylinder surface has a net-like structure.
34. (Previously Added) The electric machine of claim 33, wherein the cylinder surface of net-like structure is formed by the webs, as extending in axial and substantially in circumferential direction.
35. (Previously Added) The electric machine of claim 33, wherein the net-like structure as defined by the webs has toothed members for securement at joint areas in the recesses of the stator yoke.

## REMARKS

The last Office Action of April 18, 2003 has been carefully considered. Reconsideration of the instant application in view of the foregoing amendments and the following remarks is respectfully requested.

Claims 14-18 and 23-35 are pending in the application. Claims 14 and 15 have been amended.

It is noted that the drawings are objected to because of applicant's failure to show every feature set forth in the claims.

It is further noted that claim 15 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 14-18, 23-27, 31 and 32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 4,709,180 to Denk (hereinafter "Denk '180") in view of U.S. Pat. No. 2,711,008 to Smith.

Claims 28-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Denk and Smith in view of U.S. Pat. No. 4,968,911 to Denk (hereinafter "Denk '911").

It is noted with appreciation that claims 33-35 are indicated allowable if rewritten to include all of the limitations of the base claim and any intervening claims. However, applicants wish to defer amendments to these dependent claims in view of the arguments presented below regarding claim 14.



## **OBJECTION TO THE DRAWING**

The objection to the drawing is respectfully traversed.

Fig. 1 shows the winding assembly, designated by reference numeral "3" in the air gap, and Fig. 2 shows the winding overhangs, designated by reference numeral "11". It is applicant's belief that a person of skill in the art is able to discern the features, set forth in claim 14 from the drawings on file. Withdrawal of the objection to the drawing is thus respectfully requested.

## **REJECTION OF CLAIM 15 UNDER 35 U.S.C. §112, SECOND PARAGRAPH**

Applicant has amended claim 15 to set forth the option to at least partially wrap a bandage about the winding overhangs. It is believed that claim 15 is now clear. This change is cosmetic in nature and thus does not narrow the claim element to trigger prosecution history estoppel.

Withdrawal of the rejection of the claim 15 under 35 U.S.C. §112, second paragraph is thus respectfully requested.

## **REJECTION UNDER 35 U.S.C. §103(a)**

Applicant respectfully disagrees with the Examiner's rejection of the original claim 14 on the basis of the applied prior art for the following reasons:

The present invention, as set forth in claim 14 is directed to an electric

machine having a fastening apparatus for securing a winding assembly disposed in an air gap between a stator yoke and a rotor, whereby the stator yoke is dimensioned to extend over the winding overhangs of the winding assembly. The fastening apparatus includes a main body which is formed with a plurality of webs that extend out for engagement in complementary recesses in the stator yoke.

Please note that claim 14 has been amended to substitute the word "beyond" with --over-- to thereby clarify that the axial extension of the stator yoke is long enough to project over the winding overhangs, as shown in Fig. 2. The term "beyond" infers to an axial extension that is longer in axial direction than the overhangs. Such limitation would not properly define the full scope of what the inventor has invented and would rather unjustifiably limit claim 14. This change is cosmetic in nature and unrelated to patentability and thus does not narrow the claim element to trigger prosecution history estoppel. The specification has been amended accordingly to make it consistent with claim 14.

The Denk '180 reference describes a stator for use with a permanent magnet rotor and uses a winding support having a cylindrical portion with radially outwardly extending longitudinal support fins (48 or 82). Mounted about the outer periphery of the winding structure and extending around the outermost edges of the support fins is a cylindrical flux collector ring (stator yoke). As is clearly shown in Figs. 4 or 7, and acknowledged by the Examiner, Denk fails to teach or suggest an engagement of the fins in the collector ring. In addition, Denk also fails to teach or suggest a construction of the collector ring which is long enough

in axial direction to extend over the ends of the winding structure. Fig. 6 clearly shows the shorter axial extension of the collector ring in relation to the winding structure.

The Examiner combines Denk '180 with Smith to support a case of obviousness. More specifically, the Examiner noted that "*Smith teaches an electric machine (figure 1-3) having a stator core (B), webs (A) wherein the webs with at least partial engagement in complementary recesses in the stator yoke (figure 1)*". Applicant respectfully disagree with this interpretation of Smith. As described in col. 2, lines 36 to 39, "the core (A) is ground to size such that it has an interference fit with respect to a bore having a diameter equal to the diameter of the circle including the ends of the projections 212.". As is further described in col. 2, lines 50 to 52, when associating the component (B) with the component (A), "the ends of the core projections 202 [are] in register with the ends of the sleeve projections 212". Thus, contrary to the interpretation by the Examiner, Smith fails to describe an engagement of the webs into recesses of the stator core. This is also clearly shown in Fig. 10 of Smith, which illustrates the alignment of the webs (projections 202) of component A with the projections 212 of the component B.

Please note also that nothing in Smith would indicate an axial dimension of the component B to extend over the winding ends, as set forth in claim 14 (compare Figs. 4 and 5 in conjunction with Fig. 8)

For the reasons set forth above, it is applicant's contention that neither Denk '180 nor Smith, nor a combination thereof teaches or suggests the features

of the present invention, as recited in claim 14.

As for the rejection of the retained dependent claims, these claims depend on claim 14, share its presumably allowable features, and therefore it is respectfully submitted that these claims should also be allowed.

It should, however, be noted that these dependent claims contain individual patentable features per se. In this connection, applicant wishes to refer e.g. to claim 15 which sets forth the application of a bandage to enable a securement of the winding and allowing the arrangement of a cooling channel between winding and stator yoke (see paragraph [0034] of the instant specification. No such bandage is taught or suggested in Denk '180.

Withdrawal of the rejection under 35 U.S.C. §103(a) and allowance of claims 14-18 and 23-35 are thus respectfully requested.

## **CITED REFERENCES**

Applicant has also carefully scrutinized the further cited prior art and finds it without any relevance to the newly submitted claims. It is thus felt that no specific discussion thereof is necessary.

## **CONCLUSION**

Applicant believes that when the Examiner reconsiders the claims in the light of the above comments, he will agree that the invention is in no way properly

met or anticipated or even suggested by any of the references however they are considered.

In view of the above presented remarks and amendments, it is respectfully submitted that all claims on file should be considered patentably differentiated over the art and should be allowed.

Reconsideration and allowance of the present application are respectfully requested.

Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully requested that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. If the Examiner feels that it might be helpful in advancing this case by calling the undersigned, applicant would greatly appreciate such a telephone interview.

Respectfully submitted,

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